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Research Brief: Field Validation of Chronic, Sublethal Sediment Toxicity Tests

Issue

Federal regulations governing the disposal of dredged material require the USACE and USEPA to evaluate the potential for unacceptable long-term or chronic environmental effects resulting from such disposal. In response to this requirement, USACE recently completed development of two new chronic, sublethal bioassays for the evaluation of dredged material. These tests are the 28-day growth test with the marine polychaete worm *Neanthes arenaceodentata* and the 28-day growth and survival test with the estuarine amphipod *Leptocheirus plumulosus*. Once implemented within the regulatory testing program, these tests will be used to determine the suitability of dredged material for open water disposal. Because these new tests will affect disposal decisions, prior to regulatory implementation the USACE and USEPA must ensure the consistency and quality of the predictions that these tests provide.

Research/Objectives

The objective of the work is to evaluate the validity of two proposed chronic, sublethal, solid phase bioassays as predictive tools for the evaluation of dredged material disposal. The two tests will be used to evaluate a range of contaminated sediments and a clean reference sediment. These sediments will be placed in test containers and then deployed in the field at a selected test location. At specified intervals during the duration of the study (e.g., twice yearly during the first year of the field study, and then once in each of two subsequent years), the sediments in the test containers will be retrieved and analyzed for infaunal community composition/re-colonization and toxicity. Results of the chronic sublethal laboratory bioassays will be compared to effects observed in situ (e.g., benthic infaunal diversity, abundance, biomass, etc.) to evaluate the ability of these proposed tests to predict impacts on benthic infauna in the environment. Results from this field validation effort will play a major role in establishing how results from these bioassays should be interpreted and the role such tests should play in the regulatory decision-making process.

Results/Products

To date, a range of sediments has been evaluated and a subset selected for use in the field validation study. A comprehensive literature review of published field validation studies was conducted and the results summarized in a technical note. Sediments for the field validation study have been collected, processed, and placed in trays in the field, and an initial baseline evaluation is ongoing using the chronic, sublethal bioassays, standard acute toxicity tests, and chemical analysis.

Research Team

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